

Reflections on the provision of veterinary services to underserved regions: A case example using northern Manitoba, Canada

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Abstract — Rural, remote, and Indigenous communities often contend with free-roaming dog populations, increasing the risk of aggressive dog encounters, particularly dog bites and fatal dog attacks. This qualitative survey gathered a range of perspectives to ascertain the current veterinary services available in rural, remote, and Indigenous communities of northern Manitoba, as well as needs, barriers to, and considerations for future veterinary care provision. Survey results indicated terminology such as “overpopulation” and “rescue” need to be carefully considered as they may have negative connotations for communities. While veterinary services such as vaccination and deworming are important for public health, most programs were focused on sterilization. There was consensus that conversations must begin with individual communities to determine what services are needed and how to fulfil those needs. Perceived barriers include the remoteness of communities, finances, and culturally different views of veterinary medicine. Recommendations for future delivery of services include increased frequency and funding of current models, while others focused on different methods of delivery; all of which will require further discussions within the veterinary community and with other stakeholders.

Résumé — **Réflexions concernant la prestation de services vétérinaires dans les régions insuffisamment desservies : exemple de cas dans le nord du Manitoba, au Canada.** Les collectivités autochtones rurales et éloignées doivent souvent gérer des populations de chiens errants, ce qui augmente le risque de rencontres avec des chiens agressifs, particulièrement des morsures de chien et d'attaques mortelles par des chiens. Cette enquête qualitative a réuni un éventail de points de vue afin de déterminer les services vétérinaires actuellement disponibles dans les collectivités autochtones rurales et éloignées dans le nord du Manitoba, ainsi que les besoins, les obstacles et les considérations pour la prestation future de soins vétérinaires. Les résultats de l'enquête ont indiqué que la terminologie de «surpopulation» ou de «secours» doit être soigneusement considérée car elle évoque des connotations négatives pour les collectivités. Même si les services vétérinaires comme la vaccination et la vermifugation sont importants pour la santé publique, la plupart des programmes se concentraient sur la stérilisation. Il y avait un consensus que les conversations doivent être entamées dans les collectivités individuelles afin de déterminer les services qui sont requis et comment répondre à ces besoins. Les obstacles perçus incluent l'éloignement des collectivités, les finances et des vues culturelles différentes de la médecine vétérinaire. Des recommandations pour la prestation future de services incluent une fréquence accrue et le financement des modèles actuels, tandis que d'autres portent sur des modes de prestation différents. Toutes ces recommandations exigeront des discussions approfondies au sein de la collectivité vétérinaire et avec les autres intervenants.

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Introduction

In Canada, humans living in rural or remote communities, particularly Indigenous populations, are at increased risk of adverse health outcomes due to exposure to and infection with certain pathogens, including agents of tuberculosis, HIV/AIDS, and select zoonoses (1–4). Social determinants of health, such as poverty, poor nutrition, unemployment, and substandard

housing contribute to the pronounced risk of adverse health outcomes seen in Indigenous, particularly on-reserve communities (5–8). These determinants also affect the health and welfare of animals that are kept as companions or for work (5). Since most of the population of Canada lives in the southern portion of the country, near the American border, it should be no surprise that services to more northern rural or remote communities are

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scarce or non-existent, which is the case for veterinary services (9–11). This results in a segment of the animal population in Canada, particularly dogs and cats, which throughout their lifetime may never see a veterinarian, nor receive any preventive care such as vaccinations.

Rural and remote northern communities, whether they are Indigenous or non-Indigenous, from now on referred to as “northern communities,” often have free-roaming dog populations, increasing the risk of aggressive dog encounters, particularly fatal dog attacks (10–12). According to Raghavan (12), between 1990 and 2007 fatal dog attacks were more common in rural and remote areas (24/28 deaths) compared to urban areas (4/28 deaths), with 11 of the 24 non-urban deaths happening in aboriginal reserve communities in the Canadian prairies (12). In the past, dogs were used as sled dogs within northern communities, but this practice has decreased significantly in the last century with the advent of snowmobiles and bombardiers (13). However, dogs continue to play an important role in northern communities as wildlife deterrents or for security purposes, but are increasingly likely to be regarded solely as companion animals (10,11,14). Dog bites in northern communities in Canada are suggested to be higher than in urban areas; Sahtu, Northwest Territories — 2.2 bites per 1000 population (11) and a central First Nations community, Saskatchewan — 6.3 per 1000 (10), compared to Guelph, Ontario — 1.6 per 1000 (15). However, due to under-reporting, differences among locations and year of data collection are difficult to determine with certainty.

In many communities, there is a large number of free-roaming dogs [defined as domesticated dogs that are not confined to an owner's home or property (16)]. They may be owned, but allowed to roam freely, or may be strays (previously owned but lost or abandoned) (16). “Community dogs,” for which more than one individual or household in the community claims ownership, may be owned or strays but are dependent on humans for resources to ensure their survival and reproduction, and therefore, may be more willing to approach people in the community (14,16). A feral dog is defined as one that is born in the wild, lives and fends for itself with little to no socialization with humans; a state that is not common in communities in Canada (2,14,17). Free roaming and community dogs are more likely to form packs, threaten, injure, or kill children or adults (10,17), chase or kill livestock/wildlife, and are of primary importance for rabies control in about half of the countries in the world (14,16,18). This makes dog management in northern (and some southern) communities an important public health concern.

Several northern communities manage their dog issues by culling dogs at what are sometimes called “dog-shoot days” (10,16). This strategy is a short-term solution that “disturbs pack social order, creates empty ecological niches, and does nothing to promote dog health or welfare or community well-being” (10). In addition, it may have profound psychological impacts on community members, particularly those performing the culling. Reducing the number of sexually intact females does have a stabilizing effect on the dog population (if 70% to 85% of females in a population are spayed) and has been used in developing countries particularly as a component of rabies

prevention plans (14,16,18). Research has found that education and communication are important to relay the significance of spaying/neutering in dog population management efforts (10,14). While many researchers feel that veterinary services, such as dog spaying and neutering, may help prevent dog attacks (14), no studies have proven that it is the surgical alteration alone that causes a decline in dog bites or fatal encounters within a community.

Veterinary services can be cost-prohibitive or unavailable in northern communities, and have decreased uptake because of distrust of outsiders or limited knowledge of the need for veterinary services (10,11). Also, because of different cultural views regarding deworming, vaccinating, and spaying/neutering dogs, veterinary services may not be acceptable for some Indigenous groups (10,11). Of note, Schurer et al (10) argued that improving access to veterinary service in northern (Indigenous) communities by offering subsidized spay/neuter clinics was a contentious issue, and unlikely to be the only solution to improving public health and animal welfare concerns. Other factors hindering veterinary service delivery in northern communities include logistical challenges such as housing, road access, specific buildings in which to operate community clinics, and veterinary staff's perceptions of the physical and cultural environment (e.g., access to potable water, acceptance of veterinary team) (11,14). Further to this, some local veterinary clinics may be reluctant to provide free/low cost services as they don't believe it addresses the underlying issues of dog husbandry and welfare and is unsustainable for their livelihood (10).

The purpose of this study was to conduct a qualitative survey focused on veterinary services for Manitoba northern communities. The objective was to gather various perspectives to fully ascertain the current veterinary services available to northern communities of northern Manitoba. In addition, perceived needs, perceived barriers to, and considerations for developing future veterinary care provision were explored.

Materials and methods

This study was designed to explore the range of current services, and opinions on the barriers to use of, and perceived veterinary service needs of northern communities. Qualitative interviewing methods were used to gain the broadest responses possible from a range of participants residing or working within communities in northern Manitoba, Canada (Figure 1). For the purposes of this paper, community includes the various residents, settings, and jurisdictions that exist between on- and off-reserve communities in the Prairie provinces, with particular reference to northern communities as defined by the Government of Manitoba (19,20). Ethics approval was obtained from the University of Saskatchewan's Behavioral Research Ethics Board.

An initial list of contacts was obtained from Manitoba Health's One Health committee, which has animal and public health representatives who work in, reside in or work with northern Manitoba communities. This pool of potential participants was collected based on whether contacts were working/residing in northern communities, or travelled to one of these communities in a professional capacity/volunteer basis. The remaining contacts were obtained through referrals by study

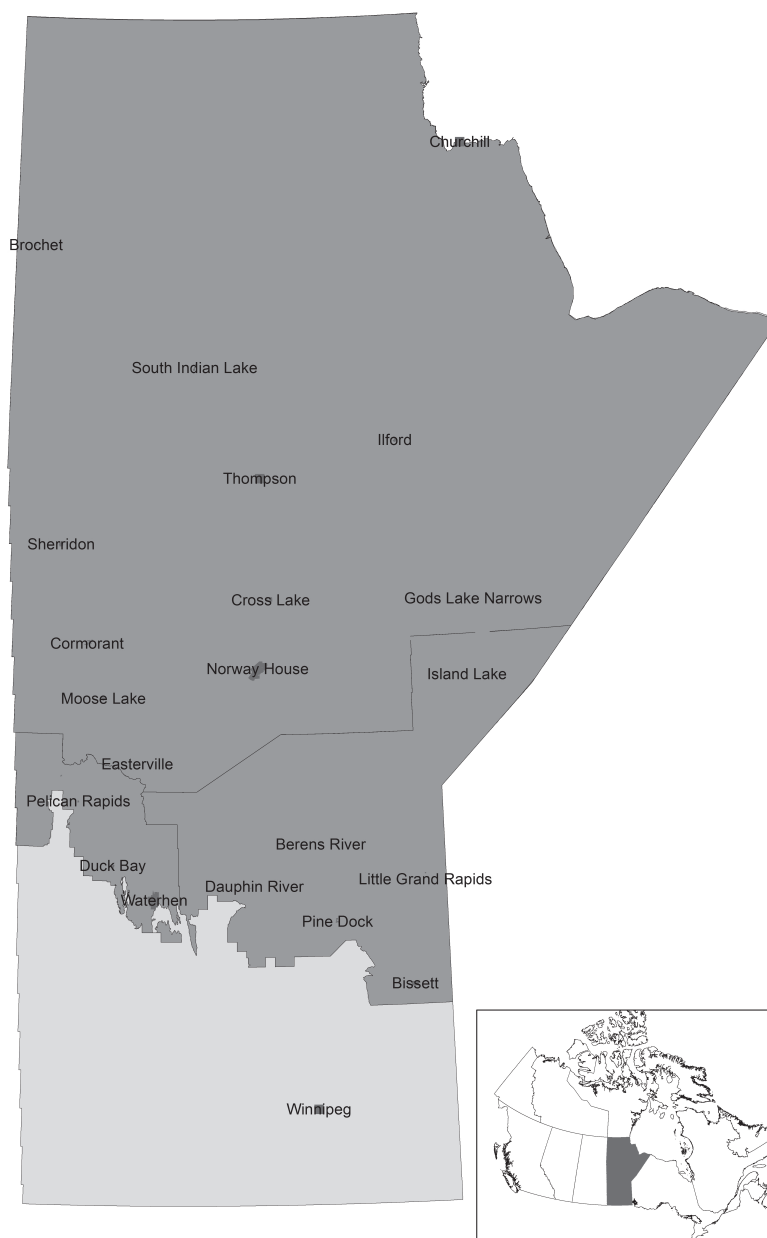


Figure 1. The geographical extent of northern Manitoba. A set of communities is indicated for visual reference. An inset is provided to orient readers to the location of the province in Canada.

participants, with particular emphasis on anyone who could provide context of residing in or working in northern communities, or travelling to provide health or veterinary services to northern communities. Each participant was either telephoned or e-mailed to ascertain their level of interest in participation. Participant contact was initiated on August 5, 2016 and continued until October 21, 2016.

Participants were asked to complete a semi-structured telephone interview governed by 4 basic areas of interest: community issues affecting animal health and use of services; current animal health services offered; barriers to veterinary or animal health services; and considerations for new programs for northern or underserved communities. However, participants were also offered the option of an e-mailed open-ended questionnaire

covering the same topics. There were 2 versions of the interview/questionnaire: 1 designed for veterinarians (Veterinarian), and the other for participants working with or residing in northern communities (Non-veterinarian). Two attempts were made to contact a person. If the invitation to participate was sent out and no response was received 3 wk later, a follow-up e-mail or telephone call was made. Subsequently, if no response was received, no more attempts were made to contact the individual. Participants were not asked to self-identify as Indigenous and if this information was offered it was not included in the analysis due to confidentiality.

Telephone interviews were recorded, with the participant's permission, and then transcribed. For e-mailed questionnaires, participants were e-mailed with follow-up questions in the

case of unclear responses or ideas expressed. Once transcribed, all voice recordings were permanently deleted. All participant responses were kept as anonymous as possible by removing names or e-mail identification when data were analyzed. Both transcripts and emailed responses were coded using a coding key which was created using 5 sample participants' responses to gather the major sub-themes within each main theme as determined by the objectives of the research as described. The sub-themes were determined by coalescing like ideas into 3 to 4 overarching concepts per theme. Quotes were used to highlight concepts and ideas as expressed by the participants.

Results

There was a total of 13 participants out of 34 persons contacted (response rate of 38%); 9 by telephone and 4 by e-mail. Veterinary participants included 6 veterinarians and 1 member of a veterinary regulatory body. Non-veterinarian participants included 2 Animal Protection Officers (APOs), 2 public health professionals, and 2 animal rescue organization members. Five of the seven veterinarians resided in southern Manitoba, and 2 resided in northern Manitoba. Of the 6 non-veterinarian participants, 3 were residents of northern Manitoba, and 3 had work-related or service provision connections to specific communities in the north. Unfortunately, no northern community residents without ties to public or animal health were interviewed in this survey.

Community issues affecting animal health and use of services

Socio-economic factors indirectly affecting animals

Participants mentioned many socio-economic factors they had seen within communities that they felt could act as barriers to animal owners seeking veterinary services, such as a lack of resources, poverty, inadequate infrastructure, and high cost of living. One non-veterinarian participant noted the impoverished and difficult life experiences, including addictions, stating it was no surprise that "once you get a segment that is so impoverished, the kids and animals will suffer." It is evident that there may often be more pressing issues that must first be addressed to help improve the well-being of everyone.

Relationship/community involvement

Community involvement in new programs as well as relationship building were stated as critical by all to working specifically with Indigenous communities; this is particularly important as most participants were not residents of the north. One participant with several years of volunteer experience noted that just going to "do the preaching and the teaching...you won't get anywhere...been there done that..." Rather, the approach taken to overcoming this "helicoptering in" mentality was to focus first and foremost on building strong relationships and trust within the communities.

Perceptions of dog over-population and animal welfare

Some participants were adamant that dog "over-population" was an irrefutable issue in communities with the lack of ster-

ilization by animal owners as the cause. On the other hand, other participants believed that it may not be an issue of "over-population" but rather an issue of animal husbandry, namely free-roaming of dogs. Over-population was defined differently by different participants, ranging from too many dogs to too many free-roaming dogs. Non-veterinarian participants provided statements that included "free-roaming," "stray," and "not regularly fed," which commented on the changing management and perceived cultural shift of the place of dogs within communities. Four non-veterinarian participants and 1 veterinary participant explained that dogs in northern communities were often very thin, had heavy parasite loads including lice, and did not appear to have adequate shelter according to the "world view" of how dogs should be kept. "Dog shoot days," more aptly termed culling of problem free-roaming dogs, were mentioned by all non-veterinarian participants as common methods used for dog population management in northern communities. Such terminology should be used cautiously as it can be misinterpreted, resulting in condemnation for communities trying to humanely deal with a present danger.

Public health concerns

Four non-veterinarian participants and 1 veterinary participant had concerns with the potential for dogs forming packs that could become aggressive with one another or to humans. One non-veterinarian participant noted that there had been a recent dog attack incident on a human within a northern region which prompted community leaders to approve a "dog shoot day." Further to this, another non-veterinarian participant stated that there are "a few cases every year that are caused by an attack by 1 or more dogs... where they have that pack-like, survivalist attitude." There are also concerns with the level of rabies vaccination coverage among dogs in these northern communities, with the same participant stating that although most dogs "...were not immunized, it would be safer for everyone in the community if more animals were immunized for rabies." Although most temporary clinics offered immunization against rabies, only 1 non-veterinarian and 1 veterinary participant responded that public health education on the risks of rabies was needed. As well, 1 non-veterinarian participant raised the concern for those children playing with the community dogs as there were severe parasite loads in animals within that community.

Current animal health services offered

When assessing the current services being offered to northern communities, 2 main types were considered: veterinary services being offered by veterinarians, often in conjunction with animal rescue organizations, and other health-related services provided to the community by public health professionals and Animal Protection Officers (APOs). It should be noted that Thompson, Manitoba has the northernmost fully equipped, permanently established veterinary clinic in Manitoba. Participants remarked that animals from many remote communities are sometimes driven or flown into Thompson for care. As well, owners can also opt to fly their animals to Winnipeg, Saskatoon, or Edmonton to receive veterinary care. It was difficult to separate the service providers, the services provided, and the reasons

Table 1. Main types of animal health service providers for northern communities with an explanation of services rendered, timing, and who covers the associated costs.

Service provider	Groups	Types of services provided	Timing of services	Costs of services
Temporary veterinary clinics and animal rescue groups	Veterinary participants	<ul style="list-style-type: none"> • Immunization against rabies, parvovirus, distemper • Sterilization (spay/neuter or contraceptive implants) • Treatment of wounds and minor problems such as ear infections • Treatment for ectoparasites such as lice or mange, general deworming, and heartworm testing • Treatment of malnutrition 	<ul style="list-style-type: none"> • Temporary clinics varied in length between 2 to 3 days, sometimes up to a week • Most veterinarians went to communities on average 1 to 2 times per year, with 1 example of an established mobile clinic operating within a community more regularly 	<ul style="list-style-type: none"> • Veterinary participants offered their services on a volunteer basis • Procedures were done on a fee for service basis to try to offset the operational costs • Resources and planning required for these clinics were substantial, as all equipment had to be brought into the communities • A few communities covered the full costs of the clinics for all their community members
	Animal rescue groups	<ul style="list-style-type: none"> • “Save dogs” by providing low-cost, temporary veterinary clinics to remote communities, through conventional surgical means or contraceptive implants on females • Build long-lasting relationships with community members — “go-to person” • Bring resources such as dog food as the cost to purchase and have it shipped up north is considerable • Educate community members on basic animal husbandry by providing coloring books and other educational materials for children 	<ul style="list-style-type: none"> • Frequency and length of time that rescue organizations operated were irregular and dependent on availability of funds 	<ul style="list-style-type: none"> • Temporary clinics were in great part subsidized by fundraising by affiliated animal rescue organization(s), while community animal owners paid what they could • Other services were covered by fundraising efforts of the affiliated rescue groups
Other health-related service providers	Animal protection officers (APOs)	<ul style="list-style-type: none"> • APOs have authority to enforce the <i>Animal Care Act</i> anywhere throughout Manitoba including remote and northern communities • Investigate concerns of neglected or abused animals which might include inadequate food or water, lack of adequate shelter, lack of adequate medical attention if injured or ill, or abandonment 	<ul style="list-style-type: none"> • APOs visit northern communities regularly but are also dispatched upon a complaint being submitted, at which time they could go and retrieve the animal if necessary 	<ul style="list-style-type: none"> • APOs are a public good and are appointed by the Province of Manitoba • Costs incurred from seizing or treating an abused animal are the responsibility of the owner upon claiming
	Communicable disease officers	<ul style="list-style-type: none"> • Investigate all animal-related human exposure incidents (bites or disease transmission) for the northern region, beginning with a verification of whether the animal had previously received veterinary care (mobile or at the Thompson Veterinary Hospital) and was up-to-date on its rabies immunizations. This may be directly with a veterinary clinic or through the APOs • Animals with out-of-date rabies immunization are referred to the nearest veterinary clinic for follow-up 	<ul style="list-style-type: none"> • If rabies was a concern in bite incident history, follow-up with the owner about any changes in the animal’s behavior or health preceding the incident or in the following 10 days. If there were difficulties in interpreting the animal’s health status, a veterinarian would be consulted; however, this was unlikely to happen as most incidents reported are considered at low risk for rabies 	<ul style="list-style-type: none"> • This is a public good and is paid for through provincial health services

behind providing those services, so the following is a summary of the motivations for and services currently provided by each provider group.

Temporary veterinary clinics and animal rescue groups

There was mention of many veterinary clinics and/or rescue organizations having gone to several specific communities in northern Manitoba as well as Nunavut, some only being accessed by winter road, airplane, or boat. All of the veterinary participants residing in southern Manitoba had gone to northern communities on several occasions to volunteer their services in addition to working in a private practice in southern Manitoba (Table 1). The veterinary services offered varied, with minimally resourced clinics often only providing immunizations/deworming while those with greater resources also offering sterilization services (Table 1). Telephone consultations were often provided to animal owners post-clinic visit and were also available on an as-needed basis for all community members, although this may not have been well-known among community animal owners.

According to both veterinary and non-veterinary participants, animal rescue organizations reportedly had similar objectives (Table 1). A main component of animal rescue work consisted of building rapport with the community's Chief and Council to seek their permission for the temporary veterinary clinics, and to build strong relationships and reliable contacts within each community who could assist in the planning and gathering or act as resources for temporary clinics and as a "go-to person." All the veterinarians who had participated in a temporary veterinary clinic said that without this contact person, planning these events would be nearly impossible. As 1 participant noted, "Our visits completely depend on a rescue group taking interest and raising funds to allow us to visit a community. They also establish rapport with the local Council and get the OK for the clinic."

Overall, the main reasons behind these temporary clinics can be summed up as follows: "We try to fix as many animals as we can while up there ... It's 1 less source of dogs and puppies Winnipeg has to contend with because rescue organizations don't have to bring them down to the city to have them fostered." There were concerns raised by both veterinary and non-veterinary participants with how some of the animal rescue organizations may operate outside of the temporary veterinary clinic collaborations. For example, there was a perception (or perhaps a misconception) that rescue organisations go into northern communities and "just gather as many free-roaming dogs as they can" and bring them to Winnipeg to be spayed/neutered with the purpose of adopting them out. The concept of "rescuing" was contentious; if the animals are not voluntarily offered for rehoming this action could strain existing relationships formed with other communities or community members.

Animal protection officers and public health professionals

The Office of the Chief Veterinary Officer (CVO) oversees enforcement of provincial animal welfare legislation called

The Animal Care Act (21) (Table 1). Any sick or injured animals could be brought by an APO to a location where they can receive veterinary care, and all other "stray" animals are housed in the local dog confinement facility (if the community has one) until they can be claimed by their owners. If the animal is not claimed within a set period of time (up to 3 mo), the animal is brought to the Winnipeg Humane Society or taken by an animal rescue group for adoption. In cases of an animal-related human exposure (bites or disease transmission), the Communicable Disease Coordinator for the north becomes involved (Table 1).

Barriers to accessing services

Remoteness/access

All but 2 participants agreed that remoteness and poor access to some of the northern communities were barriers to both the community seeking veterinary services and veterinary services coming into the community. All participants noted how northern communities were often located far from the nearest veterinary clinic and could only be accessed by boat, plane or winter road. On the other hand, the 2 participants who did not agree thought that it was not an issue of accessibility, but rather a "lack of will of the animal owner to bring their pet in for veterinary care." This showcases the different opinions that exist, some of which may need to be dispelled before trusting relationships between communities and providers of services can be cultivated.

Perception of veterinary medicine/cultural differences

All veterinary participants and some of the non-veterinarian participants perceived differences in cultural values of animals, specifically for Indigenous people, as a barrier to accessing veterinary services. "They are very uncomfortable with veterinary services like spaying and neutering their animals. Animals fit differently in their lives compared to non-Indigenous people." Two veterinary participants felt that offering temporary veterinary clinics could be misconstrued as imposing Western values on Indigenous cultures, which was deemed to be worse if strong connections had not been made with community members. Finally, 3 participants who reside in northern Manitoba specifically commented that it may not have been well-known to animal owners that veterinary services could be accessed or how to access them. Focus should be made on identifying specific community member perceptions concerning veterinary medicine as these comments may not be truly representative. However, once perceptions are more concretely identified, a good communication plan that identifies services and the value that they provide to the animal would be prudent for all northern communities.

Financial and logistic concerns

The perceived financial barriers to accessing veterinary services in northern communities were two-fold. First, temporary veterinary clinics were resource-intensive and logistically difficult to plan. Subsequently, the costs associated with veterinary services were seen as a potential and significant barrier for individuals/communities to implement. However, there was some ambiguity by participants on who should bear the costs of providing veterinary services. About half of the participants said that the onus

should be on the animal owner to pay for veterinary services, while others put the onus on community leaders or community organizations and recommended that fundraising be done or resources put aside for regular temporary veterinary clinics. As 1 non-veterinarian participant said, "... these (veterinary services) shouldn't be free. They should be low-cost, yes, but not free. Otherwise, people won't see the value in what they're getting." While all participants thought that more funding was needed to assist in offsetting the costs, 2 veterinary participants specifically stated that the provincial government should provide the grants.

Considerations for new programs

Veterinary services moving forward

All but 2 participants stated that veterinary services in northern Manitoba were inadequate and identified increased basic veterinary services as important needs within northern communities. In view of these needs, most participants (11/13) stated that the frequency of temporary veterinary clinics should be increased, i.e., quarterly or bi-annual visits by veterinary teams to some regions would be sufficient.

Responsibility for programs

One veterinary participant indicated it was first necessary to determine what community members perceived as their primary objective with the establishment of a new program, be it to reduce animal bite incidents, reduce the risk of rabies or manage a perceived dog 'over-population' issue. All participants stressed the importance of community involvement in these programs, from the initial needs identification to development, implementation, and finding of resources. One veterinary participant noted that what was lacking were veterinarians wanting to play a leadership role; veterinarians who could demonstrate initiative in providing services to northern communities.

Factors other than veterinary services

All participants said that community dog-related by-laws were also required to address concerns of animal husbandry, e.g., free-roaming dogs. Three non-veterinary participants further elaborated, suggesting that restrictions be put on the number of dogs allowed, promotion of tethering dogs on personal property, requirement of mandatory sterilization and immunizations, or even not allowing unvaccinated dogs into the community. It was also noted that either an APO or local by-law officer was needed to enforce any established by-laws.

All 6 veterinary and 4 non-veterinary participants recommended education, which should include education on the benefits of veterinary services, especially sterilization; other topics could include basic animal husbandry, risk of rabies and other public health issues, animal training such as "puppy classes," and workshops on how to safely interact with dogs. Such education would have to be done in a culturally sensitive manner due to the cultural differences present in different community settings. One non-veterinarian participant suggested that there should be more collaboration among public health professionals, veterinarians, and community members to address the variety of perceived needs.

Innovations for provision of veterinary services

One veterinary participant recommended that the *Health of Animals Act* should be modified to allow APOs, nurses, emergency medical services personnel, and other designated community members to vaccinate for rabies. Currently, the federal *Health of Animals Act* only allows licensed veterinarians to administer rabies immunizations to animals, with a provision for lay vaccinators who have undergone training by the Canadian Food Inspection Agency. It was stated that such provisions should also include immunizations for parvovirus and distemper, and administration of dewormers. Other suggestions included the promotion of telephone consultations with veterinarians in non-serious cases, which would help to build rapport and increase awareness of veterinary issues among community members.

One non-veterinarian participant suggested veterinary stations, very similar to nursing stations, could be established and operated in rotation by various veterinarians coming in from out of town. Another recommendation put forth by a veterinary participant, echoed by a non-veterinarian participant, was to have veterinary students and animal health technologists train and practice their skills in northern communities. Currently, there are a few learning opportunities available for veterinary students interested in working in northern communities; however, it is not a mandatory part of the curriculum. If integrated into the curriculum, it was felt that veterinary schools could help promote and build a sustained interest for northern community work among new veterinarians. Such programs would also raise awareness of the socio-economic situation in some of these northern communities and foster an appreciation for Indigenous cultures. It was noted that a similar endeavor has proven successful among medical residents in Manitoba, whereby the medical school has promoted the rewards of working in northern community early on in their academic training.

Discussion

This qualitative survey provided an overview of the current range of veterinary services available to remote northern communities in Manitoba. It also highlighted the participants' perceptions of barriers to accessing veterinary services, and of community issues that might influence access to veterinary services. Although the sample size was small, it did represent a variety of public health and animal health individuals working, residing, or travelling on a frequent basis into these northern communities. It unfortunately is lacking the perspectives of the potential service users who reside in the communities.

It is evident that terminology used by groups visiting communities will need to be addressed and defined. There was no consensus among participants on whether dogs need to be "rescued" and whether there is an "over-population" issue in northern communities. However, whether there is an "over-population" issue should not be determined by outsiders to the communities in the north but rather by the communities themselves. It is important for a community to define the dog-related issues that are present within its boundaries before committing resources to any new population management program (22). In addition, while reducing the number of dogs in a community

may assist in decreasing the likelihood of fatal dog attacks or aggressive encounters, it is likely this will only be effective in conjunction with education, by-laws, and other community engagement (22,23). It was refreshing to find that participants sought and valued community participation in all aspects from defining the issues to determining the solutions.

Perceived community issues were mostly associated with existing socio-economic situations and the associated hardships faced by community members and their pets on a daily basis. Brook et al (11) identified animal welfare as a perceived issue in several northern Indigenous communities, of which the major sources of mortality for dogs in remote northern communities included being hit by vehicles, being shot (culled), exposure (often puppies), starvation, dehydration, and infectious diseases such as parvovirus infection and distemper; all of which are preventable (4,11). Several studies have also identified issues related to zoonotic parasites, for example *Echinococcus*, in northern communities with large free-roaming dog populations (2–4,10,11,24). Often, a fatality within the community stimulates an immediate desire to react. It is therefore important to find mechanisms for provision of services in areas lacking veterinary services; however, veterinary-based solutions may not be the best nor first course of action for all of these dog-related issues.

Veterinary services such as vaccination and deworming are important from a public health perspective. Routine vaccination of domestic dogs began in 1940, making wild animal reservoirs and unvaccinated dogs in contact with rabid wildlife the greatest risk for rabies in Canada (25,26). The principle variant and vector of rabies in most of the prairies (Alberta, Saskatchewan, and Manitoba) is the skunk; however, the picture presented historically and by present day provincial rabies surveillance suggests that some northern Manitoba communities may be at relatively low risk (27). Although some human cases of rabies have been prevented with post-exposure treatment for animal bites, it costs a considerable amount of money for each high risk bite case, which would be reduced if the offending animal was immunized. Therefore, rabies vaccination should be considered as part of any community program as a form of public health protection even in low-risk areas.

Participants outlined the needs they believed northern communities had and provided recommendations and considerations for existing and new programs, all of which will require further discussions within the veterinary community. Based on the current method of delivery, given the issues of logistics and finances mentioned by participants, it is highly unlikely (given the vastness of Canada's north) that all communities lacking services could be serviced using the existing volunteer model. The idea of connecting veterinary services with a public health focus may lead to innovative ways to service all areas of the north effectively. It will be imperative that the veterinary community first works towards understanding the service needs and then explores the best methods available to meet those needs.

Throughout, participants voiced concerns that communities must have involvement in all phases of the program — needs identification, program development, implementation and evaluation — and that this was critical for the success of any

endeavour. This is encouraging as it places the emphasis on community-driven management rather than an “imposed” plan of action. It was also evident when speaking to participants with several years' experience working in northern communities that there were particular challenges; specifically, that it was a multi-faceted issue, requiring a collaborative, culturally sensitive approach involving community members, community leaders and all other stakeholders.

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Book Review

Compte rendu de livre

Chronic Disease Management for Small Animals, 1st edition

Grame WD, Milner RJ, Lobetti R, eds. John Wiley & Sons, Hoboken, New Jersey, USA. 2018. 384 pp. ISBN: 9781-1192-0089-5.

A first of its kind, this text serves as a handy desk reference to assist with chronic disease case management. What makes this book unique is that it provides not only a concise review of chronic diseases, but also an emphasis on the quality of life issues affecting both the patient and the caregiver.

The first section, in this author's opinion, should be mandatory for all veterinarians, no matter how long they have been in practice. "Communication, Caregiving and Chronic Disease" highlights the importance of effective communication with clients and covers verbal and non-verbal cues.

The body of the text covers a multitude of specific chronic diseases from all body systems. Each chapter, written by a different specialist in their respective field, has a similar format and includes a succinct overview of the disease, including diagnosis and therapy, and ends with a quality of life evaluation. Most of the chapters are extremely well-written and easy to read. "Chronic Diseases of the Eye and Adnexa" and "Heart Disease" are notable for their thoroughness and inclusion of high quality photographs. "Managing Mobility" is especially helpful considering the importance of mobility in geriatric pets. It provides a thorough review of the emerging field of rehabilitation and

sports medicine, including a look at the latest available diagnostics and integrative therapies.

The weakest chapter was, by far, "Chronic Kidney Disease." Considering the prevalence of kidney disease in senior cats, this chapter was noticeably thin and dated compared to other topics in this text. For example, there is no mention of the implications of the renal biomarker symmetric dimethylarginine (SDMA) or the use of calcitriol. Lacking also is a chapter on feline cognitive dysfunction, although the canine topic is covered. Following editions will benefit from more stringent editing to round out some topics and correct grammar and spelling mistakes.

The final topic, "Hospice Care and End of Life," takes an in-depth look at the challenges and benefits of hospice care and euthanasia. It includes information on how to guide and support not only patients but clients as well through difficult end-of-life issues.

So often as veterinarians we focus on the patient and the disease, neglecting the physical and emotional toll on the caretaker. This text focuses on using expert communication to support the human-animal bond and will be an invaluable guide for the recent graduate. The structured layout and comprehensive review make it a beneficial resource for the seasoned practitioner as well.

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